

NOTES ON THE LIFE HISTORY OF *PELECIUM SULCATUM* GUÉRIN<sup>1</sup>.

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On the ninth of December, 1926, while searching for insects at the edge of a banana plantation near Sevilla, Department of Magdalena, Colombia, I came across a beetle pupa lying about 5 cm. deep in the soil of a grassy area a few metres distant from the bananas. The pupa was casually examined and then isolated in a vial. Early on the morning of December eleventh it was found to be accompanied by a small, spindle-shaped larva which appeared to be eating it. Twice the larva was moved a few millimetres off, and each time it made its way back and lay with its mouthparts touching the pupa. By noon the larva had grown enormously and had turned slightly darker in colour. On the morning of December twelfth it had completed its meal and was about 8 mm. long and 2.5 mm. in maximum diameter, tapering to each end. Nothing remained of the beetle pupa but its shrivelled skin; it had been completely consumed in twenty-four hours or a very little more. On December fifteenth the larva seemed about to pupate but failed to do so, and three days afterwards was dead and mouldy.

Some months later, in the same general locality, a similar larva was found eating a soft young leptodesmid millipede in its transformation chamber in the damp soil of a banana field. It completed its meal, lay for some days quiescent, and then pupated. After a pupal period of five days it emerged as an adult beetle which Mr. Howard Notman has kindly identified for me as *Peleciium sulcatum Guérin*, one of the Peleciinæ (Dupuis, 1913), an aberrant group of Carabidæ. As nothing seems to be known of the immature stages and life history of any member of the subfamily, and as, in the course of my work, several other larvæ, pupæ, and adults of this interesting beetle were obtained, I venture to offer these very sketchy notes.

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In all, six larvæ were found, four devouring soft millipedes, one eating a beetle pupa, and one, taken by my assistant, was reported to me as feeding on a chrysomelid larva but the host was not brought in for identification. It was attempted to raise all the larvæ and no specimen was preserved, so that only a field description of the stage can be given. The full-grown larva is dirty white in color, with a gray, median, dorsal line extending from the thoracic segments to the posterior tip of the body. The length varies, probably with the size of the host, from 7 to 10 mm., the form is always stout and spindle-shaped, the head-capsule elongate. The three pairs of thoracic legs are so short in comparison with the unwieldy bulk of the body that at this stage, at least, the larva is incapable of active or extended movement. As eggs were not obtained, the full duration of the larval stage is unknown. The period of active feeding, however, is very short. The specimen first mentioned completed its meal of a beetle pupa and became 8 cm. long in a little over twenty-four hours. Another which fed upon a soft millipede grew in length from 4 mm. to 9 mm. and increased several times in bulk in about forty-eight hours. Only one of the six larvæ was successfully brought to maturity.

When first formed the pupa is entirely whitish, but it assumes darker colours as it matures. Twenty-four hours after pupation the eyes are faintly gray, in another day they have become brown, and after seventy-two hours are entirely black. At the end of the fourth day the eyes are black, the mandibles brown, and the posterior tarsi darkened. The duration of the pupal stage in the only specimen that was raised from larva to adult was five days. Two pupæ found in the field, whose age at collection I estimated from the colour to be one or two days, emerged four days later. The pupal period, therefore, is in the order of five or six days. Eight pupæ in all were found in the field; naked, in small cavities four to eight centimetres deep in the soil. Only two of these emerged as adults; injury at the time of excavation accounting for the high mortality.

When it first emerges the adult beetle is still cream-coloured, but rapidly darkens and in a day is quite black though the chitin

at that time is not yet completely hardened. One adult specimen, entirely black though still somewhat soft, was found in an oval cavity in the soil together with fragments of a millipede which had probably served as its host. Nothing was observed of the habits of the adult beetle; it is able to move fairly quickly but does not impress one as a particularly active insect. Adult specimens vary greatly in size, probably with the size of the host.

In this brief outline notice has been taken of the late larval stage, the pupa, and the adult; the egg and the early larval periods remain unknown. This lacuna in our knowledge is unfortunate. Indeed, one of the most interesting questions in the life history remains unsolved; the problem, namely, of how the *Peleciium* larva comes to its host. There are two possibilities; either the female beetle lays her egg upon the intended victim, or the very young larva itself seeks out its prey.

In 1905, Silvestri described the life history of a lebiine carabid, *Lebia scapularis* Fourcroy, which feeds in the larval stage on the pupa of the elm leaf beetle, *Galerucella luteola* Müller. He found that the young larva of the *Lebia* is of an elongate form, with well-developed mandibles and legs, and able to move about with agility. In this stage it seeks and attacks a pupa of *Galerucella*. Eating voraciously, it soon becomes fusiform in shape, increases considerably in size, and, although retaining its anatomical characters, loses its ease of movement, its legs, now comparatively short, scarcely serving to move it slowly even when aided by vermicular movements of the abdomen. Later, it constructs a cocoon and therein transforms to a second stage larva, a pupa, and finally to the adult.

Silvestri's account of *Lebia* suggests that *Peleciium* likewise has a small, active, primary larva which itself seeks out its prey, and then, on account of its great increase in size, loses its power of rapid movement and becomes the fat, fulsiform, inactive larva I have described. As far as my observations go, however, *Peleciium* has not a distinct secondary larval stage such as Silvestri describes for *Lebia*, and it certainly does not construct a cocoon in which to pass the pupal period.